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# **Data Validation Summary Report for the 100-DR-1 Operable Unit 100-D-Ponds Phase II Sampling**

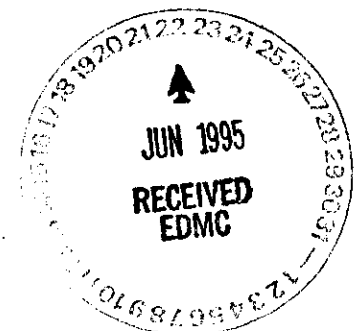
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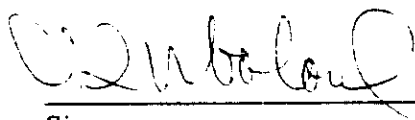
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### APPROVAL PAGE

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100-DR-1 OPERABLE UNIT 100-D-PONDS PHASE II  
SAMPLING

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## ACRONYMS

%D	Percent difference
AA	Atomic absorption
BFB	Bromofluorobenzene
BNA	Base/neutral and acid
CCB	Continuing calibration blank
CV	Coefficient of variation
CCV	Continuing calibration verification
CLP	Contract laboratory program
CRA	CRDL standard for AA
CRDL	Contract Required Detection Limit
CRI	CRDL standard for ICP
CRII	CRDL standard for ICP initial
CRIF	CRDL standard for ICP final
CRQL	Contract required quantitation limit
CVAA	Cold vapor atomic absorption
DBC	Dibutylchloroendate
DFTPP	Decafluorotriphenylphosphine
DQO	Data quality objectives
EPA	U.S. environmental protection agency
GC/MS	Gas chromatography/mass spectrometry
GC	Gas chromatography
GFAA	Graphite furnace atomic absorption
GPC	Gel permeation chromatography
ICB	Initial calibration blank
ICP	Inductively coupled plasma emission spectrometry
ICS	ICP interference check sample
ICV	Initial calibration verification
IDL	Instrument detection limit
LCS	Laboratory control sample
LCSS	Laboratory control sample soil
LCSW	Laboratory control sample water
MDA	Minimum detectable activity
MSA	Method of standard addition
MS/MSD	Matrix spike/matrix spike duplicate
PBW	Preparation blank water
PCB	Polychlorinated biphenyl
PEM	Performance evaluation mixture
QA	Quality assurance
QC	Quality control
RDL	Required detection limit
RF	Response factor
RIC	Reconstructed ion chromatogram

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## 1.0 INTRODUCTION

The information provided in this validation summary report includes data from the chemical analyses of samples from the 100-DR-1 Operable Unit 100-D-Ponds Phase II Sampling Investigation. All of the data from this sampling event and their related quality assurance samples were reviewed and validated to verify that the reported sample results were of sufficient quality to support decisions regarding remedial actions performed at this site.

Sample analyses included volatile organic, semi-volatile organic, pesticide/PCB, metals, general chemistry and radiochemistry. Three volatile organic samples were analyzed by Quanterra Environmental Services (QTES). The volatile organic samples were validated using Westinghouse-Hanford protocols specified in *Data Validation Procedures for Chemical Analyses*, WHC-SD-EN-SPP-002, Rev. 2. All volatile organic data were qualified based on this guidance. The table below lists the volatile organic Sample Delivery Groups (SDGs) that were validated for this sampling event.

SDG No.	Matrix	No. of Samples Analyzed	Level of Validation	Parameters
W0429	S	2	D	Volatile Organics
W0430	S	1	D	Volatile Organics

Three semi-volatile organic samples were analyzed by Quanterra Environmental Services (QTES). The semi-volatile organic samples were validated using Westinghouse-Hanford protocols specified in *Data Validation Procedures for Chemical Analyses*, WHC-SD-EN-SPP-002, Rev. 2. All semi-volatile organic data were qualified based on this guidance. The table below lists the semi-volatile organic SDGs that were validated for this sampling event.

SDG No.	Matrix	No. of Samples Analyzed	Level of Validation	Parameters
W0429	S	2	D	Semi-Volatiles
W0430	S	1	D	Semi-Volatiles

Three pesticide/PCB samples were analyzed by Quanterra Environmental Services (QTES). The pesticide/PCB samples were validated using Westinghouse-Hanford protocols specified in *Data Validation Procedures for Chemical Analyses*, WHC-SD-EN-SPP-002, Rev. 2. All pesticide/PCB data were qualified based on this guidance. The table below lists the pesticide/PCB SDGs that were validated for this sampling event.

SDG No.	Matrix	No. of Samples Analyzed	Level of Validation	Parameters
W0429	S	2	D	General Chem
W0430	S	1	D	General Chem

Three samples were analyzed for radiochemical parameters by QTES laboratories.

Radiochemistry sample analyses included the following parameters:

- Gross alpha and gross beta determination
- Gamma spectroscopy

The radiochemical samples were validated using the Westinghouse-Hanford protocols specified in *Data Validation Procedures for Radiochemical Analyses*, WHC-SD-EN-SPP-001, Rev. 1. All radiochemical samples were qualified based on this guidance. The table below lists the radiochemistry SDGs that were validated for this sampling event.

SDG No.	Matrix	No. of Samples Analyzed	Level of Validation	Parameters
W0429	S	2	D	Radiochemistry
W0430	S	1	D	Radiochemistry

The following report is broken down into sections for volatile organic, semi-volatile organic, pesticide/PCB, metals, general chemical and radiochemical analyses. Each volatile organic section includes:

- A general validation summary which addresses precision, accuracy, representativeness, completeness, and comparability;
- Holding times;
- GC/MS tuning and calibration;
- Blanks, including method blanks;
- Analytical accuracy including matrix spike samples, matrix spike duplicates, surrogates and internal standards performance;
- Analytical precision including matrix spike/matrix spike duplicates;
- Compound identification;
- Sample result quantitation, verification and reported detection limits; and
- System performance and overall assessment.

Each semi-volatile section includes:

- A general validation summary which addresses precision, accuracy, representativeness, completeness, and comparability;
- Holding times;

Each radiochemistry section includes:

- A general validation summary which addresses precision, accuracy, representativeness, completeness, and comparability;
- Holding times;
- Calibrations;
- Blanks, including laboratory, method and field blanks;
- Analytical accuracy including chemical recoveries, matrix spike samples and laboratory control samples;
- Analytical precision including laboratory duplicates, field duplicates and field splits;
- Sample result quantitation, verification and reported detection limits; and
- System performance and overall assessment.

In addition, the appendices include the data summary tables as well as the validated laboratory report forms for volatile organic, semi-volatile organic, pesticide/PCB, metals, general chemistry and radiochemistry analyses.

Data validation personnel added qualifiers to the reported data based on specified data quality objectives. Qualifiers which may be applied by data validators in compliance with the procedures herein are as follows:

- U - Indicates the compound or analyte was analyzed for and not detected in the sample. The value reported is the same quantitation limit corrected for sample dilution and moisture content by the laboratory.
- UJ - Indicates the compound or analyte was analyzed for and not detected in the sample. Due to a QC deficiency identified during the data validation, the associated quantitation limit is an estimate.
- J - Indicates the compound or analyte was analyzed for and detected. Due to a QC deficiency identified during the data validation, the associated concentration is an estimate, but the data are usable for decision-making purposes.
- BJ - Applied to inorganic analyses only. Indicates the analyte concentration was greater than the IDL but less than the CRDL and is considered an estimated value.
- R - Indicates the compound or analyte was analyzed for, detected, and due to an identified QC deficiency, the data are unusable.
- UR - Indicates the compound or analyte was analyzed for and not detected in the sample. Additionally, the data is unusable due to an identified QC deficiency.
- NJ - Indicates presumptive evidence of a compound at an estimated value. The data may not be valid for some specific applications (i.e., usable for decision-making purposes).

## **2.0 VOLATILE ORGANIC DATA VALIDATION SUMMARY**

### **2.1 SUMMARY**

Positive blank contamination was noted for one methylene chloride result in SDG No. W0429 and for one methylene chloride result in SDG No. W0430. Positive blank results were detected in two acetone results in SDG No. W0429. All associated sample results were flagged accordingly.

With the exceptions noted above, the project-specific data quality objectives in terms of precision, accuracy, completeness, representativeness, and comparability have been met.

### **2.2 HOLDING TIMES**

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be analyzed within 14 days of the date of sample collection.

If holding times are exceeded, but not by  $>2x$  the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by  $>2x$  the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Holding times were met for all samples.

### **2.3 GC/MS TUNING AND CALIBRATION**

Instrument calibration is performed to establish that the GC/MS instrument is capable of producing acceptable and reliable analytical data over a range of concentrations. The initial and continuing calibrations are performed according to CLP protocols and all results must meet validation requirements set by Westinghouse-Hanford (WHC 1992,b). An initial multipoint calibration is performed prior to sample analysis to establish the linear range of the GC/MS instrument. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

All initial and continuing calibration results were acceptable.

All matrix spike results were acceptable.

### **2.5.2 Surrogates**

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. When a surrogate compound recovery is out of the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Undetected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Compounds with surrogate recoveries  $< 10\%$  are qualified as estimates "J" for detects, and "UR" for nondetects. Undetected compounds with surrogate recoveries greater than the upper control limit require no qualification.

All surrogate recovery results were acceptable.

### **2.5.3 Internal Standards Performance**

The evaluation of the internal standards criteria provide a means to assess the stability and sensitivity of the GC/MS system on every analysis. Internal standard area counts must be within the limits of  $-50\%$  to  $+100\%$  of the most recent standard. The retention time of the internal standard must not vary by more than  $\pm 30$  seconds of the most recent calibration. If area counts for a particular internal standard are outside the control limits or relative retention time criteria are  $> \pm 30$  seconds, all associated sample results are qualified as estimates (J for detects, UJ for non-detects). If area counts and retention times are both outside control limits, all non-detect sample results associated with that internal standard are qualified as unusable "UR".

All internal standard recovery results were acceptable.

were recalculated to ensure that the reported results were accurate. Raw data were examined for anomalies, transcription errors, and reduction errors. The reviewer verified that the results and detection limits fell within the linear range of the instrument.

All sample results and reported detection limits were acceptable.

## **2.9 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT**

A review of instrument continuing calibration information and QC data indicates that instrument performance was adequate. Positive blank contamination was noted in two acetone results and in one methylene chloride result in SDG No. W0429. Positive blank contamination was noted in one methylene chloride result in SDG No. W0430. The associated sample results were flagged accordingly. Contamination, however, was not significantly high enough to affect the usability of the data. All other validated results are considered accurate within the standard error associated with the methods.

All data packages submitted for validation were found to be 100% complete.

### 3.0 SEMI-VOLATILE ORGANIC DATA VALIDATION SUMMARY

#### 3.1 SUMMARY

Positive blank contamination was noted for all aldol condensate and butylbenzylphthalate results in both SDGs. Due to an internal standard recovery outside control limits, all results in SDG No. W0429 associated with internal standard perylene-d12 were qualified as estimates. All associated sample results were flagged accordingly.

With the exceptions noted above, the project-specific data quality objectives in terms of precision, accuracy, completeness, representativeness, and comparability have been met.

#### 3.2 HOLDING TIMES

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded, but not by  $>2x$  the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by  $>2x$  the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Holding times were met for all samples.

#### 3.3 GC/MS TUNING AND CALIBRATION

Instrument calibration is performed to establish that the GC/MS instrument is capable of producing acceptable and reliable analytical data over a range of concentrations. The initial and continuing calibrations are performed according to CLP protocols and all results must meet validation requirements set by Westinghouse-Hanford (WHC 1992,b). An initial multipoint calibration is performed prior to sample analysis to establish the linear range of the GC/MS instrument. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

All initial and continuing calibration results were acceptable.

estimates and flagged "UJ". Sample results  $> 5x$  the spike concentration require no qualification.

All matrix spike results were acceptable.

### 3.5.2 Surrogates

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. When a surrogate compound recovery is out of the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Undetected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Compounds with surrogate recoveries  $< 10\%$  are qualified as estimates "J" for detects, and "UR" for nondetects. Undetected compounds with surrogate recoveries greater than the upper control limit require no qualification.

All surrogate recovery results were acceptable.

### 3.5.3 Internal Standards Performance

The evaluation of the internal standards criteria provide a means to assess the stability and sensitivity of the GC/MS system on every analysis. Internal standard area counts must be within the limits of  $-50\%$  to  $+100\%$  of the most recent standard. The retention time of the internal standard must not vary by more than  $\pm 30$  seconds of the most recent calibration. If area counts for a particular internal standard are outside the control limits or relative retention time criteria are  $> \pm 30$  seconds, all associated sample results are qualified as estimates (J for detects, UJ for non-detects). If area counts and retention times are both outside control limits, all non-detect sample results associated with that internal standard are qualified as unusable "UR".

Due to an internal standard recovery outside control limits, all results associated with internal standard perylene-d12 in SDG No. W0429 have been qualified as estimates and flagged "UJ/J".

All other internal standard recovery results were acceptable.

the project-specific CRQLs were met. Sample results and reported detection limits were recalculated to ensure that the reported results were accurate. Raw data were examined for anomalies transcription errors, and reduction errors. The reviewer verified that the results and detection limits fell within the linear range of the instrument.

All sample results and reported detection limits were acceptable.

### **3.9 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT**

A review of instrument continuing calibration information and QC data indicates that instrument performance was adequate. Positive blank contamination was noted in all aldol condensate and butylbenzylphthalate results in both SDGs. The associated sample results were flagged accordingly. Due to an internal standard recovery outside control limits, all results in SDG No. W0429 associated with internal standard perylene-d12 were qualified as estimates and flagged "UJ/J". Data flagged "J" indicate the associated concentration is an estimate, but the data are usable for decision making purposes. All other validated results are considered accurate within the standard error associated with the methods.

All data packages submitted for validation were found to be 100% complete.

## **4.0 PESTICIDE/PCB DATA VALIDATION SUMMARY**

### **4.1 SUMMARY**

Due to calibration verification results outside QC limits, twelve compounds in SDG No. W0429 and eleven compounds in SDG No. W0430 were qualified as estimates. All associated sample results were flagged accordingly.

With the exceptions noted above, the project-specific data quality objectives in terms of precision, accuracy, completeness, representativeness, and comparability have been met.

### **4.2 HOLDING TIMES**

Analytical holding times were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Soil samples must be extracted within 14 days of the date of sample collection and analyzed within 40 days from the date of extraction.

If holding times are exceeded, but not by  $> 2x$  the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by  $> 2x$  the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Holding times were met for all samples.

### **4.3 GC/MS TUNING AND CALIBRATION**

#### **4.3.1 Initial Calibration**

The laboratory performed an initial multipoint calibration for all target compounds at the concentration required by SW-846 protocols. The linearity of the initial calibration is established when the %RSD or the calibration factors are  $< 20\%$ . If the RSD is  $> 20\%$ , all detected results are qualified as estimates and flagged "J", and all non-detects are flagged "UJ".

All initial calibration results were acceptable.

compounds and % recoveries must be within established laboratory quality control limits. If spike recoveries are outside control limits, detected sample results  $< 5x$  the spike concentration are qualified as estimates and flagged "J". Undetected sample results with spike recoveries outside control limits are qualified as estimates and flagged "UJ". Sample results  $> 5x$  the spike concentration require no qualification.

All matrix spike results were acceptable.

#### **4.5.2 Surrogates**

The analyses of surrogate compounds provide a measure of performance for individual samples. Matrix-specific surrogate compound recovery control windows have been established by the laboratory. When a surrogate compound recovery is out of the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates and flagged "J". Undetected compounds with surrogate recoveries less than the lower control limit are qualified as having an estimated detection limit and flagged "UJ". Compounds with surrogate recoveries  $< 10\%$  are qualified as estimates "J" for detects, and "UR" for nondetects. Undetected compounds with surrogate recoveries greater than the upper control limit require no qualification.

All surrogate recovery results were acceptable.

### **4.6 ANALYTICAL PRECISION**

#### **4.6.1 Matrix spike/matrix spike duplicates**

Matrix spike/matrix spike duplicate results provide matrix-specific information on the precision of the method for specific target compound classes. Precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. For soil samples analyzed using SW-846 protocol, results must be within RPD limits of  $\pm 35\%$ . If RPD values are out of specification and the sample concentration is  $< 5x$  the spike concentration, all associated detected sample results are qualified as estimates and flagged "J". If RPD values are out of specification and the sample concentration is  $> 5x$  the spike concentration, no qualification is required.

All matrix spike/matrix spike duplicate RPD results were acceptable.

## 5.0 METALS DATA VALIDATION SUMMARY

### 5.1 SUMMARY

Negative blank contamination was detected in one sample. Minor matrix spike recovery problems were noted for three analytes in one sample delivery group. All associated sample results were flagged accordingly.

With the exceptions noted above, the project-specific data quality objectives in terms of precision, accuracy, completeness, representativeness, and comparability have been met.

### 5.2 HOLDING TIMES

Analytical holding times for ICP metals and GFAA metals analyses were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: Samples must be analyzed within six months for all metals.

Holding times were met for all samples.

### 5.3 CALIBRATIONS

Performance of specific instrument quality assurance and quality control procedures, including deficiencies noted during the quality assurance review, are outlined below.

Three calibration standards and a blank were analyzed for arsenic, lead, selenium and thallium by GFAA. The correlation coefficient of a least squares linear regression met the requirements for calibration in all cases.

At least one standard and a blank were analyzed by ICP for all other elements.

The above calibrations were each immediately verified with an ICV standard and a calibration blank. The ICV was prepared from a source independent of the calibration standards, at a mid-calibration range concentration. The ICV percent recovery must fall within the control limits of 90% to 110% for metals analyzed by ICP and GFAA. Calibration linearity near the detection limit was verified with a standard prepared at a concentration near the CRDL.

The ICVs met the recommended control limits in all cases.

within (2x) the absolute blank value are qualified as estimates and flagged "J". The qualification applies only to results generated between the associated calibration blank and the nearest acceptable calibration blank.

All calibration blank results were acceptable.

#### **5.4.2 Preparation Blanks**

At least one preparation blank, consisting of deionized distilled water must be prepared and analyzed with every sample delivery group. In the case of positive blank results, samples with results (in ug/L) of ( $< 5x$ ) the preparation blank value have had their associated values qualified as non-detected and flagged "U". Samples with concentrations of ( $> 5x$ ) the highest blank concentration do not require qualification.

If the absolute value of the negative preparation blank exceeds the CRDL, all associated undetected results are rejected and flagged "UR". All associated detects that are ( $< 10x$ ) the absolute value of the preparation blank result are qualified as estimates and flagged "J". If the sample results are ( $> 10x$ ) the absolute value of the preparation blank, no qualification is necessary. If the absolute value of the negative preparation blank is  $> IDL$  and  $\leq CRDL$ , all associated non-detected sample results are qualified as estimates and flagged "UJ". All associated detects ( $< 10x$ ) the absolute value of the preparation blank are qualified as estimates and flagged "J".

Due to the presence of a negative preparation blank result, sample number BODMT4 in SDG No. W0430 was flagged "BJ" for beryllium.

All other preparation blank results were acceptable.

### **5.5 ACCURACY**

#### **5.5.1 Matrix Spike Samples**

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must fall within the range of 75% to 125%. Samples with a spike recovery of  $< 30\%$  and a sample value below the IDL were rejected and flagged "UR". Samples with a spike recovery of 30% to 74% and a sample result  $< IDL$  are qualified "UJ". Samples with a spike recovery of  $> 125\%$  or  $< 75\%$  and a sample result  $> IDL$  are qualified "J". All samples with a spike recovery  $> 125\%$  and a sample result  $< IDL$  require no qualification.

#### 5.5.4 Method of Standard Addition (MSA) Results

For all samples whose analytical spike results are outside the 85% to 115% control limit and whose absorbances are  $> 50\%$  of the analytical spike absorbance, an MSA is required. In cases where the MSA correlation coefficient was  $< 0.995$ , the MSA analysis was repeated once. If the correlation coefficient was still  $< 0.995$ , samples were qualified as estimates and flagged "J". If a sample required MSA analysis but was not analyzed, all associated data must be qualified as estimates and flagged "J".

All MSA results were acceptable.

### 5.6 ANALYTICAL PRECISION

#### 5.6.1 Laboratory Duplicate Samples

The laboratory duplicate results assess the precision of the method by measuring a second aliquot of the sample that is treated the same way as the original. If the RPD of the original sample and its duplicate is  $> 35\%$  and the positive sample result is ( $> 5x$ ) the CRDL, the associated sample result is qualified as an estimate and flagged "J". Also, if the difference between the duplicate samples is  $> \pm \text{CRDL}$  and the positive sample result is ( $< 5x$ ) the CRDL, the associated sample result is qualified as an estimate and flagged "J".

All laboratory duplicate recovery results were acceptable.

#### 5.6.2 ICP Serial Dilution

The ICP serial dilution is used to determine whether significant physical or chemical interferences exist due to sample matrix. If a sample concentration is ( $\geq 50x$ ) the IDL for an analyte and the %D is outside the  $\pm 10\%$  control limits the associated data must be qualified as estimates and flagged "J".

No ICP serial dilution was analyzed with the SDGs in this report. No data was qualified since SW-846 methods do not require dilution analysis unless sample concentrations are greater than the linear range of the instrument.

#### 5.6.3 Field Duplicates

Field duplicate results are compared using the same guidelines for determining the RPD between a sample and its duplicate. Data are not qualified based on field duplicates.

## 5.8 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT

A review of instrument continuing calibration information and QC data indicates that instrument performance was adequate. Negative blank contamination was detected in one beryllium sample in SDG No. W0430. The associated sample result was flagged accordingly. Contamination, however, was not significantly high enough to affect the usability of the data. Due to matrix

spike recovery problems, antimony, manganese and thallium results in SDG No. W0430 were qualified as estimates and flagged (BJ, J, or UJ). Data flagged "J" indicates that the associated concentration is an estimate, but the data are usable for decision making purposes. All other validated results are considered accurate within the standard error associated with the methods.

All data packages submitted for validation were found to be 100% complete.

## 6.0 GENERAL CHEMISTRY DATA VALIDATION SUMMARY

### 6.1 SUMMARY

The project-specific data quality objectives in terms of precision, accuracy, completeness, representativeness, and comparability have been met.

### 6.2 HOLDING TIMES

Analytical holding times for fluoride, sulfate, chloride, sulfide, nitrate, nitrite, phosphate, nitrate/nitrite and TOX were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: 28 days for chloride, fluoride, sulfate, TOX and nitrate/nitrite; seven days for sulfide; and two days for nitrate, nitrite and phosphate.

If holding times are exceeded, but not by ( $> 2x$ ) the limit, all associated sample results are qualified as estimates and flagged "J" for detects and "UJ" for non-detects. If holding times are exceeded by ( $> 2x$ ) the limit, all associated detectable sample results are qualified as estimates and flagged "J" and all non-detects are rejected and flagged "UR".

Holding times for all analytes met QC requirements.

### 6.3 CALIBRATIONS

#### 6.3.1 Initial Calibration

The following calibration procedures must be conducted:

- At least one blank and three standards were used to establish the ion chromatography, ion selective electrode, and spectrophotometer calibrations prior to sample analysis with a correlation  $\geq 0.995$ .
- At least two reference buffers or standards at a high and low concentration were used to calibrate the pH and conductivity meters.

If any of these initial calibration requirements are not met, all associated data are qualified "J" for detects and "UJ" for non-detects.

All initial calibration results were acceptable.

performance criteria for solid LCS samples are established by the manufacturer or the laboratory.

ICV results obtained from the raw data were used to calculate LCS results. All LCS results were found to be acceptable.

## **6.6 PRECISION**

### **6.6.1 Laboratory Duplicates**

The laboratory duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Laboratory duplicate RPDs must fall below 20% for waters and 35% for soils. If an RPD for an aqueous sample is  $> 20\%$  and the sample result is  $(> 5x)$  the CRDL, all associated detects are qualified as estimates and flagged "J". If the range between duplicate aqueous samples is  $> \pm CRDL$  and the sample result is  $(< 5x)$  the CRDL, all associated detects are qualified as estimates and flagged "J". If an RPD for soil samples is  $> 35\%$  and the sample result is  $(> 5x)$  the CRDL, all associated detects are flagged "J". If the range between duplicate soil samples is  $> \pm 2CRDL$  and the sample result is  $(< 5x)$  the CRDL, then all detects are flagged "J".

All laboratory duplicate results were acceptable.

### **6.6.2 Field Duplicates**

Field duplicate sample analyses are used to measure both the lab and field sampling procedure precision. Field duplicate results are compared using the same guidelines for determining the precision between a sample and its duplicate. Data are not qualified based on field duplicates.

There were no field duplicates associated with the subject SDGs.

### **6.6.3 Field Split Samples**

A field split sample is a representative sample from a sampling event that is sent to a third party laboratory. Field split sample results are evaluated by comparing the corresponding sample results to the reference laboratory sample results. Data qualification is not required for field splits.

There were no field splits associated with the subject SDGs.

## **7.0 RADIOCHEMISTRY DATA VALIDATION SUMMARY**

### **7.1 SUMMARY**

Radium-228 results for all samples in SDG No. W0429 were qualified as estimates due to the lack of a duplicate analysis. Uranium-238 results for all samples in SDG No. W0429 were qualified as estimates due to a laboratory duplicate RPD of 39%. All associated sample results were flagged accordingly.

With the exceptions noted above, the project-specific data quality objectives in terms of precision, accuracy, completeness, representativeness, and comparability have been met.

### **7.2 HOLDING TIMES AND SAMPLE PREPARATION**

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for radiochemical analyses is six months. Tritium sample preparation requires distillation. Tritium samples must be analyzed within seven days of distillation.

All holding times and sample preparation measures were acceptable.

### **7.3 CALIBRATIONS**

Instrument calibration is performed to establish that the counters used to determine radionuclide activities are capable of producing acceptable and reliable analytical data. Each counting system must be factory calibrated at installation and after any maintenance or repair. Calibration consists of an instrument efficiency determination for each applicable radionuclide. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible.

All calibration results, including efficiency checks and background counts, were acceptable.

### **7.4 LABORATORY BLANKS**

Laboratory blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination. If blank analysis results indicate the presence of an analyte above the MDA, the following qualifiers were applied: All positive sample results ( $< 5x$ ) the highest blank concentration were qualified as estimated; sample results below the MDA were

### **7.6.2 Field Duplicates**

Field duplicate results are compared using the same guidelines for determining the RPD between a sample and its duplicate. Data qualification is not required for field duplicate RPDs.

There were no field duplicates associated with the subject SDGs.

### **7.6.3 Field Split Samples**

A field split sample is a representative sample from a sampling event that is sent to a third party laboratory. The field split sample results are evaluated by comparing the corresponding sample results to the reference laboratory sample results. Data qualification is not required for field splits.

There were no field splits associated with the subject SDGs.

## **7.7 SAMPLE RESULTS QUANTITATION, VERIFICATION AND REPORTED DETECTION LIMITS**

Twenty percent of sample results and reported detection limits were recalculated to ensure that the reported results were accurate. Raw data were examined for anomalies, transcription errors, and reduction errors. The MDA for each analyte was assessed to ensure that it met the CRDL.

The reviewer verified that the results and detection limits fell within the linear range of the instrument. All data packages submitted for validation were found to be complete. All sample results and reported detection limits were acceptable.

## **7.8 SYSTEM PERFORMANCE AND OVERALL ASSESSMENT**

A review of instrument continuing calibration information and QC data indicates that instrument performance was adequate for these analyses. Due to the lack of a duplicate analysis, all radium-228 results in SDG No. W0429 were qualified as estimates and flagged "J". All uranium-238 results in SDG No. W0429 were qualified as estimates due to a laboratory duplicate RPD of 39%. Data flagged "J" indicate the associated concentration is an estimate, but the data are usable for decision making purposes. All other validated results are considered accurate within the standard error associated with the methods.

All data packages submitted for validation were found to be 100% complete.

## 8.0 REFERENCES

- EPA, 1987, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, Third Edition, Environmental Protection Agency, Washington, D.C.
- EPA, 1988a, *EPA Contract Laboratory Program Statement of Work for Organics Analyses, Multi-Media, Multi-Concentration*, U.S. Environmental Protection Agency, Washington, D.C.
- EPA, 1988b, *Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses*, U.S. Environmental Protection Agency, Washington, D.C.
- EPA, 1988c, *EPA Contract Laboratory Program Statement of Work for Inorganics Analyses, Multi-Media, Multi-Concentration*, U.S. Environmental Protection Agency, Washington, D.C.
- EPA, 1988d, *Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analyses*, U.S. Environmental Protection Agency, Washington, D.C.
- EPA, 1990, *EPA Contract Laboratory Program Statement of Work for Inorganic Analyses, Multi-media, Multi-Concentration*, U.S. Environmental Protection Agency, Washington, D.C.
- EPA, 1991, *EPA Contract Laboratory Program Statement of Work for Organics Analyses, Multi-Media, Multi-Concentration*, Environmental Protection Agency, Washington, D.C.
- WHC, 1992a, *Data Validation Procedures for Chemical Analyses*, WHC-SD-EN-SPP-002, Rev. 2, Westinghouse Hanford Company, October 1993.
- WHC, 1992b, *Data Validation Procedure for Radiological Analyses*, WHC-SD-EN-SPP-001, Rev. 2, Westinghouse Hanford Company, 1993.

## APPENDICES

**APPENDIX A**  
**VOLATILE ORGANIC DATA SUMMARY TABLES**

Project: WESTINGHOUSE-HANFORD																			
Laboratory: QUANTERRA																			
Case:		SDG: W0429																	
Sample Number		B0DMT2		B0DMT3															
Location		Test Pit #2		Test Pit #2															
Remarks																			
Sample Date		01/17/95		01/17/95															
Analysis Date		01/25/95		01/26/95															
Volatile Organic Compound	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chloromethane	10	18	U	31	U														
Bromomethane	10	18	U	31	U														
Vinyl Chloride	10	18	U	31	U														
Chloroethane	10	18	U	31	U														
Methylene Chloride	10	20	U	74	U														
Acetone	10	43	U	51	U														
Carbon Disulfide	10	9	U	16	U														
1,1-Dichloroethene	10	9	U	16	U														
1,1-Dichloroethane	10	9	U	16	U														
1,2-Dichloroethene (total)	10	9	U	16	U														
Chloroform	10	9	U	16	U														
1,2-Dichloroethane	10	9	U	16	U														
2-Butanone	10	180	U	310	U														
1,1,1-Trichloroethane	10	9	U	16	U														
Carbon Tetrachloride	10	9	U	16	U														
Bromodichloromethane	10	9	U	16	U														
1,2-Dichloropropane	10	9	U	16	U														
cis-1,3-Dichloropropene	10	9	U	16	U														
Trichloroethene	10	9	U	16	U														
Dibromochloromethane	10	9	U	16	U														
1,1,2-Trichloroethane	10	9	U	16	U														
Benzene	10	9	U	16	U														
trans-1,3-Dichloropropene	10	9	U	16	U														
Bromoform	10	9	U	16	U														
4-Methyl-2-pentanone	10	89	U	160	U														
2-Hexanone	10	89	U	160	U														
Tetrachloroethene	10	9	U	16	U														
1,1,2,2-Tetrachloroethane	10	9	U	16	U														
Toluene	10	9	U	16	U														
Chlorobenzene	10	9	U	16	U														
Ethylbenzene	10	9	U	16	U														
Styrene	10	9	U	16	U														
Xylene (total)	10	9	U	16	U														

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**APPENDIX B**  
**VOLATILE ORGANIC VALIDATED LABORATORY REPORT FORMS**

## VOLATILE ORGANICS ANALYSIS DATA SHEET

BHI-00405

Rev. 00  
BODMT2

Lab Name: QUANTERRA MO

Contract: 550-56

Lab Code: ITMO

Case No.: V34402

SDG No.: W0429

Matrix: (soil/water) SOIL

Lab Sample ID: 7344-002

Sample wt/vol: 5.00 (g/mL) G

Lab File ID: F0621

Level: (low/med) LOW

Date Received: 01/18/95

% Moisture: not dec. 44

Date Analyzed: 01/25/95

Column: (pack/cap) CAP

Dilution Factor: 1.0

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG Q

74-87-3-----	Chloromethane	18	U
74-83-9-----	Bromomethane	18	U
75-01-4-----	Vinyl Chloride	18	U
75-00-3-----	Chloroethane	18	U
75-09-2-----	Methylene Chloride	20	U
67-64-1-----	Acetone	43	U
75-15-0-----	Carbon Disulfide	9	U
75-35-4-----	1,1-Dichloroethene	9	U
75-34-3-----	1,1-Dichloroethane	9	U
540-59-0-----	1,2-Dichloroethene (total)	9	U
67-66-3-----	Chloroform	9	U
107-06-2-----	1,2-Dichloroethane	9	U
78-93-3-----	2-Butanone	180	U
71-55-6-----	1,1,1-Trichloroethane	9	U
56-23-5-----	Carbon Tetrachloride	9	U
75-27-4-----	Bromodichloromethane	9	U
78-87-5-----	1,2-Dichloropropane	9	U
10061-01-5-----	cis-1,3-Dichloropropene	9	U
79-01-6-----	Trichloroethene	9	U
124-48-1-----	Dibromochloromethane	9	U
79-00-5-----	1,1,2-Trichloroethane	9	U
71-43-2-----	Benzene	9	U
10061-02-6-----	trans-1,3-Dichloropropene	9	U
75-25-2-----	Bromoform	9	U
108-10-1-----	4-Methyl-2-Pentanone	89	U
591-78-6-----	2-Hexanone	89	U
127-18-4-----	Tetrachloroethene	9	U
79-34-5-----	1,1,2,2-Tetrachloroethane	9	U
108-88-3-----	Toluene	9	U
108-90-7-----	Chlorobenzene	9	U
100-41-4-----	Ethylbenzene	9	U
100-42-5-----	Styrene	9	U
1330-20-7-----	Xylene (total)	9	U

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1/87 Rev

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B-1

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.  
BHI-00405

Rev. 00  
BODMT3

Lab Name: QUANTERRA MO

Contract: 550-56

Lab Code: ITMO

Case No.: V34402

SDG No.: W0429

Matrix: (soil/water) SOIL

Lab Sample ID: 7344-004

Sample wt/vol: 5.00 (g/mL) G

Lab File ID: F0635

Level: (low/med) LOW

Date Received: 01/18/95

% Moisture: not dec. 68

Date Analyzed: 01/26/95

Column: (pack/cap) CAP

Dilution Factor: 1.0

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG Q

74-87-3-----	Chloromethane	31	U
74-83-9-----	Bromomethane	31	U
75-01-4-----	Vinyl Chloride	31	U
75-00-3-----	Chloroethane	31	U
75-09-2-----	Methylene Chloride	74	U
67-64-1-----	Acetone	51	U
75-15-0-----	Carbon Disulfide	16	U
75-35-4-----	1,1-Dichloroethene	16	U
75-34-3-----	1,1-Dichloroethane	16	U
540-59-0-----	1,2-Dichloroethene (total)	16	U
67-66-3-----	Chloroform	16	U
107-06-2-----	1,2-Dichloroethane	16	U
78-93-3-----	2-Butanone	310	U
71-55-6-----	1,1,1-Trichloroethane	16	U
56-23-5-----	Carbon Tetrachloride	16	U
75-27-4-----	Bromodichloromethane	16	U
78-87-5-----	1,2-Dichloropropane	16	U
10061-01-5-----	cis-1,3-Dichloropropene	16	U
79-01-6-----	Trichloroethene	16	U
124-48-1-----	Dibromochloromethane	16	U
79-00-5-----	1,1,2-Trichloroethane	16	U
71-43-2-----	Benzene	16	U
10061-02-6-----	trans-1,3-Dichloropropene	16	U
75-25-2-----	Bromoform	16	U
108-10-1-----	4-Methyl-2-Pentanone	160	U
591-78-6-----	2-Hexanone	160	U
127-18-4-----	Tetrachloroethene	16	U
79-34-5-----	1,1,2,2-Tetrachloroethane	16	U
108-88-3-----	Toluene	16	U
108-90-7-----	Chlorobenzene	16	U
100-41-4-----	Ethylbenzene	16	U
100-42-5-----	Styrene	16	U
1330-20-7-----	Xylene (total)	16	U

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1/87 Rev

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3/27/95 SC

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.  
BHI-00405

Rev. 00  
BODMT4

Lab Name: QUANTERRA MO

Contract: 550-56

Lab Code: ITMP

Case No.: V44408

SDG No.: W0430

Matrix: (soil/water) SOIL

Lab Sample ID: 7444-008

Sample wt/vol: 5.00 (g/mL) G

Lab File ID: E2000

Level: (low/med) LOW

Date Received: 01/30/95

% Moisture: not dec. 6

Date Analyzed: 02/06/95

Column: (pack/cap) CAP

Dilution Factor: 1.0

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG Q

74-87-3	-----Chloromethane	11	U
74-83-9	-----Bromomethane	11	U
75-01-4	-----Vinyl Chloride	11	U
75-00-3	-----Chloroethane	11	U
75-09-2	-----Methylene Chloride	11	U
67-64-1	-----Acetone	110	U
75-15-0	-----Carbon Disulfide	5	U
75-35-4	-----1,1-Dichloroethene	5	U
75-34-3	-----1,1-Dichloroethane	5	U
540-59-0	-----1,2-Dichloroethene (total)	5	U
67-66-3	-----Chloroform	5	U
107-06-2	-----1,2-Dichloroethane	5	U
78-93-3	-----2-Butanone	110	U
71-55-6	-----1,1,1-Trichloroethane	5	U
56-23-5	-----Carbon Tetrachloride	5	U
75-27-4	-----Bromodichloromethane	5	U
78-87-5	-----1,2-Dichloropropane	5	U
10061-01-5	-----cis-1,3-Dichloropropene	5	U
79-01-6	-----Trichloroethene	5	U
124-48-1	-----Dibromochloromethane	5	U
79-00-5	-----1,1,2-Trichloroethane	5	U
71-43-2	-----Benzene	5	U
10061-02-6	-----trans-1,3-Dichloropropene	5	U
75-25-2	-----Bromoform	5	U
108-10-1	-----4-Methyl-2-Pentanone	53	U
591-78-6	-----2-Hexanone	53	U
127-18-4	-----Tetrachloroethene	5	U
79-34-5	-----1,1,2,2-Tetrachloroethane	5	U
108-88-3	-----Toluene	5	U
108-90-7	-----Chlorobenzene	5	U
100-41-4	-----Ethylbenzene	5	U
100-42-5	-----Styrene	5	U
1330-20-7	-----Xylene (total)	5	U

FORM I VOA  
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3/30/95 SC

**APPENDIX C**  
**SEMIVOLATILE ORGANIC DATA SUMMARY TABLES**

Project: WESTINGHOUSE-HANFORD																					
Laboratory: QUANTERRA																					
Case:		SDG: W0429																			
Sample Number		B0DMT2		B0DMT3																	
Location		Test Pit #2		Test Pit #2																	
Remarks																					
Sample Date		01/17/95		01/17/95																	
Extraction Date		01/20/95		01/20/95																	
Analysis Date		01/23/95		01/23/95																	
Semivolatile Compound	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Phenol	330	1200	U	2100	U																
bis(2-Chloroethyl)ether	330	1200	U	2100	U																
2-Chlorophenol	330	1200	U	2100	U																
1,3-Dichlorobenzene	330	1200	U	2100	U																
1,4-Dichlorobenzene	330	1200	U	2100	U																
1,2-Dichlorobenzene	330	1200	U	2100	U																
2-Methylphenol	330	1200	U	2100	U																
2,2'-oxybis(1-Chloropropane)	330	1200	U	2100	U																
4-Methylphenol	330	1200	U	2100	U																
N-Nitroso-di-n-propylamine	330	1200	U	2100	U																
Hexachloroethane	330	1200	U	2100	U																
Nitrobenzene	330	1200	U	2100	U																
Isophorone	330	1200	U	2100	U																
2-Nitrophenol	330	1200	U	2100	U																
2,4-Dimethylphenol	330	1200	U	2100	U																
bis(2-Chloroethoxy)methane	330	1200	U	2100	U																
2,4-Dichlorophenol	330	1200	U	2100	U																
1,2,4-Trichlorobenzene	330	1200	U	2100	U																
Naphthalene	330	1200	U	2100	U																
4-Chloroaniline	1700	2300	U	4100	U																
Hexachlorobutadiene	330	1200	U	2100	U																
4-Chloro-3-methylphenol	1700	2300	U	4100	U																
2-Methylnaphthalene	330	1200	U	2100	U																
Hexachlorocyclopentadiene	330	1200	U	2100	U																
2,4,6-Trichlorophenol	330	1200	U	2100	U																
2,4,5-Trichlorophenol	330	1200	U	2100	U																
2-Chloronaphthalene	330	1200	U	2100	U																
2-Nitroaniline	1700	5900	U	10000	U																
Dimethyl phthalate	330	1200	U	2100	U																
Acenaphthylene	330	1200	U	2100	U																
2,6-Dinitrotoluene	330	1200	U	2100	U																

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 BH-06205  
 Rev. 10/95  
 R/S

Project: WESTINGHOUSE-HANFORD																						
Laboratory: QUANTERRA																						
Case:		SDG: W0430																				
Sample Number		B0DMT4																				
Location		Test Pit #2																				
Remarks																						
Sample Date		01/27/95																				
Extraction Date		02/02/95																				
Analysis Date		02/06/95																				
Semivolatile Compound	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	
Phend	330	700	U																			
Bis(2-Chloroethyl)ether	330	700	U																			
2-Chlorophenol	330	700	U																			
1,3-Dichlorobenzene	330	700	U																			
1,4-Dichlorobenzene	330	700	U																			
1,2-Dichlorobenzene	330	700	U																			
2-Methylphenol	330	700	U																			
2,2'-oxybis(1-Chloropropane)	330	700	U																			
4-Methylphenol	330	700	U																			
N-Nitroso-di-n-propylamine	330	700	U																			
Hexachloroethane	330	700	U																			
Nitrobenzene	330	700	U																			
Isophorone	330	700	U																			
2-Nitrophenol	330	700	U																			
2,4-Dimethylphenol	330	700	U																			
Bis(2-Chloroethoxy)methane	330	700	U																			
2,4-Dichlorophenol	330	700	U																			
1,2,4-Trichlorobenzene	330	700	U																			
Naphthalene	330	700	U																			
4-Chloroaniline	1700	1400	U																			
Hexachlorobutadiene	330	700	U																			
4-Chloro-3-methylphenol	1700	1400	U																			
2-Methylnaphthalene	330	700	U																			
Hexachlorocyclopentadiene	330	700	U																			
2,4,6-Trichlorophenol	330	700	U																			
2,4,5-Trichlorophenol	330	700	U																			
2-Chloronaphthalene	330	700	U																			
2-Nitroaniline	1700	3500	U																			
Dimethyl phthalate	330	700	U																			
Acenaphthylene	330	700	U																			
2,6-Dinitrotoluene	330	700	U																			

Rev 100  
 2/5/95  
 BHL-00405

## **APPENDIX D**

### **SEMIVOLATILE ORGANIC VALIDATED LABORATORY REPORT FORMS**

1B  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.  
BHI-00405

Rev. 00  
B0DMT2

Lab Name: QUANTERRA MO

Contract: 550-56

Lab Code: ITMO

Case No.: S34402

SAS No.:

SDG No.: W0429

Matrix: (soil/water) SOIL

Lab Sample ID: 7344-002

Sample wt/vol: 30.00 (g/mL) G

Lab File ID: A7716

Level: (low/med) LOW

Date Received: 01/18/95

% Moisture: not dec. 44 dec.

Date Extracted: 01/20/95

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 01/23/95

GPC Cleanup: (Y/N) N

pH:

Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

108-95-2-----	Phenol	1200	U
111-44-4-----	bis(2-Chloroethyl) Ether	1200	U
95-57-8-----	2-Chlorophenol	1200	U
541-73-1-----	1,3-Dichlorobenzene	1200	U
106-46-7-----	1,4-Dichlorobenzene	1200	U
95-50-1-----	1,2-Dichlorobenzene	1200	U
95-48-7-----	2-Methylphenol	1200	U
108-60-1-----	2,2'-oxybis(1-Chloropropane)	1200	U
106-44-5-----	4-Methylphenol	1200	U
621-64-7-----	N-Nitroso-Di-n-Propylamine	1200	U
67-72-1-----	Hexachloroethane	1200	U
98-95-3-----	Nitrobenzene	1200	U
78-59-1-----	Isophorone	1200	U
88-75-5-----	2-Nitrophenol	1200	U
105-67-9-----	2,4-Dimethylphenol	1200	U
111-91-1-----	bis(2-Chloroethoxy) Methane	1200	U
120-83-2-----	2,4-Dichlorophenol	1200	U
120-82-1-----	1,2,4-Trichlorobenzene	1200	U
91-20-3-----	Naphthalene	1200	U
106-47-8-----	4-Chloroaniline	2300	U
87-68-3-----	Hexachlorobutadiene	1200	U
59-50-7-----	4-Chloro-3-Methylphenol	2300	U
91-57-6-----	2-Methylnaphthalene	1200	U
77-47-4-----	Hexachlorocyclopentadiene	1200	U
88-06-2-----	2,4,6-Trichlorophenol	1200	U
95-95-4-----	2,4,5-Trichlorophenol	1200	U
91-58-7-----	2-Chloronaphthalene	1200	U
88-74-4-----	2-Nitroaniline	5900	U
131-11-3-----	Dimethyl Phthalate	1200	U
208-96-8-----	Acenaphthylene	1200	U
606-20-2-----	2,6-Dinitrotoluene	1200	U

FORM I SV-1

1/87 Rev

3/27/95 SC

D-1

1F  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.  
BHI-00405

Rev. 00  
B0DMT2

Lab Name: QUANTERRA MO

Contract: 550-56

Lab Code: ITMO

Case No.: S34402

SAS No.:

SDG No.: W0429

Matrix: (soil/water) SOIL

Lab Sample ID: 7344-002

Sample wt/vol: 30.00 (g/mL) G

Lab File ID: A7716

Level: (low/med) - LOW

Date Received: 01/18/95

% Moisture: not dec. 44 dec.

Date Extracted: 01/20/95

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 01/23/95

GPC Cleanup: (Y/N) N pH:

Dilution Factor: 1.00

Number TICs found: 22

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 0	Aldol Condensation	4.64	25000	ABJ U
2.	Aldol Condensation	4.70	2600	ABJ U
3.	UNKNOWN	16.77	240	J
4.	UNKNOWN	18.59	2800	J
5.	Unknown Alkane	18.84	1200	J
6.	Unknown Alkane	18.94	320	J
7.	Unknown Alkane	19.44	290	J
8.	UNKNOWN	20.50	390	J
9.	Unknown C12H6Cl4	22.92	220	J
10.	Unknown C12H6Cl4	23.02	340	J
11.	Unknown C12H5Cl5	23.53	1400	J
12.	Unknown C12H5Cl5	24.07	590	J
13.	Unknown C12H4Cl6	24.46	560	J
14.	Unknown C12H4Cl6	24.70	990	J
15.	Unknown C12H5Cl5	24.79	900	J
16.	Unknown C12H4Cl6	25.22	1100	J
17.	Unknown C12H4Cl6	25.75	1200	J
18.	Unknown C12H3Cl7	26.02	500	J
19.	Unknown C12H3Cl7	27.03	650	J
20.	UNKNOWN	28.32	610	J
21.	UNKNOWN	29.60	1000	J
22.	UNKNOWN	29.88	1100	J

3/27/95 SC

1C  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.  
BHI-00405

Rev. 00  
BODMT3

Lab Name: QUANTERRA MO

Contract: 550-56

Lab Code: ITMO

Case No.: S34402

SAS No.:

SDG No.: W0429

Matrix: (soil/water) SOIL

Lab Sample ID: 7344-004

Sample wt/vol: 30.00 (g/mL) G

Lab File ID: A7718

Level: (low/med) LOW

Date Received: 01/18/95

% Moisture: not dec. 68 dec.

Date Extracted: 01/20/95

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 01/23/95

GPC Cleanup: (Y/N) N pH:

Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

99-09-2-----	3-Nitroaniline	10000	U
83-32-9-----	Acenaphthene	2100	U
51-28-5-----	2,4-Dinitrophenol	10000	U
100-02-7-----	4-Nitrophenol	10000	U
132-64-9-----	Dibenzofuran	2100	U
121-14-2-----	2,4-Dinitrotoluene	2100	U
84-66-2-----	Diethylphthalate	2100	U
7005-72-3-----	4-Chlorophenyl-phenylether	2100	U
86-73-7-----	Fluorene	2100	U
100-01-6-----	4-Nitroaniline	4100	U
534-52-1-----	4,6-Dinitro-2-Methylphenol	10000	U
86-30-6-----	N-Nitrosodiphenylamine (1)	2100	U
101-55-3-----	4-Bromophenyl-phenylether	2100	U
118-74-1-----	Hexachlorobenzene	2100	U
87-86-5-----	Pentachlorophenol	10000	U
85-01-8-----	Phenanthrene	470	J
120-12-7-----	Anthracene	460	J
86-74-8-----	Carbazole	2100	U
84-74-2-----	Di-n-Butylphthalate	2100	U
206-44-0-----	Fluoranthene	940	J
129-00-0-----	Pyrene	820	J
85-68-7-----	Butylbenzylphthalate	2100 1400	U
91-94-1-----	3,3'-Dichlorobenzidine	4100	U
56-55-3-----	Benzo(a)Anthracene	340	J
218-01-9-----	Chrysene	400	J
117-81-7-----	bis(2-Ethylhexyl) Phthalate	130	J
117-84-0-----	Di-n-Octyl Phthalate	2100	J
205-99-2-----	Benzo(b) Fluoranthene	580	J
207-08-9-----	Benzo(k) Fluoranthene	220	J
50-32-8-----	Benzo(a) Pyrene	290	J
193-39-5-----	Indeno(1,2,3-cd) Pyrene	2100	J
53-70-3-----	Dibenz(a,h) Anthracene	2100	J
191-24-2-----	Benzo(g,h,i) Perylene	2100	J

(1) - Cannot be separated from Diphenylamine

D-5

FORM I SV-2

1/87 Rev

## SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

BHI-00405

Rev. 00  
BCDMT4

Lab Name: QUANTERRA MO

Contract: 550-56

Lab Code: ITMO

Case No.: S44408

SAS No.:

SDG No.: W0430

Matrix: (soil/water) SOIL

Lab Sample ID: 7444-008

Sample wt/vol: 30.00 (g/mL) G

Lab File ID: D6748

Level: (low/med) LOW

Date Received: 01/30/95

% Moisture: not dec. 6 dec.

Date Extracted: 02/02/95

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 02/06/95

GPC Cleanup: (Y/N) N pH:

Dilution Factor: 1.00

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
---------	----------	---	---

108-95-2-----	Phenol	700	U
111-44-4-----	bis(2-Chloroethyl) Ether	700	U
95-57-8-----	2-Chlorophenol	700	U
541-73-1-----	1,3-Dichlorobenzene	700	U
106-46-7-----	1,4-Dichlorobenzene	700	U
95-50-1-----	1,2-Dichlorobenzene	700	U
95-48-7-----	2-Methylphenol	700	U
108-60-1-----	2,2'-oxybis(1-Chloropropane)	700	U
106-44-5-----	4-Methylphenol	700	U
621-64-7-----	N-Nitroso-Di-n-Propylamine	700	U
67-72-1-----	Hexachloroethane	700	U
98-95-3-----	Nitrobenzene	700	U
78-59-1-----	Isophorone	700	U
88-75-5-----	2-Nitrophenol	700	U
105-67-9-----	2,4-Dimethylphenol	700	U
111-91-1-----	bis(2-Chloroethoxy) Methane	700	U
120-83-2-----	2,4-Dichlorophenol	700	U
120-82-1-----	1,2,4-Trichlorobenzene	700	U
91-20-3-----	Naphthalene	700	U
106-47-8-----	4-Chloroaniline	1400	U
87-68-3-----	Hexachlorobutadiene	700	U
59-50-7-----	4-Chloro-3-Methylphenol	1400	U
91-57-6-----	2-Methylnaphthalene	700	U
77-47-4-----	Hexachlorocyclopentadiene	700	U
88-06-2-----	2,4,6-Trichlorophenol	700	U
95-95-4-----	2,4,5-Trichlorophenol	700	U
91-58-7-----	2-Chloronaphthalene	700	U
88-74-4-----	2-Nitroaniline	3500	U
131-11-3-----	Dimethyl Phthalate	700	U
208-96-8-----	Acenaphthylene	700	U
606-20-2-----	2,6-Dinitrotoluene	700	U

FORM I SV-1

1/87 F

D-7

3/30/95

1F  
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET  
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE N.  
BHI-00405

Rev. 00  
BODMT4

Lab Name: QUANTERRA MO

Contract: 550-56

Lab Code: ITMO

Case No.: S44408

SAS No.:

SDG No.: W0430

Matrix: (soil/water) SOIL

Lab Sample ID: 7444-008

Sample wt/vol: 30.00 (g/mL) G

Lab File ID: D6748

Level: (low/med) LOW

Date Received: 01/30/95

% Moisture: not dec. 6 dec.

Date Extracted: 02/02/95

Extraction: (SepF/Cont/Sonc) SONC

Date Analyzed: 02/06/95

GPC Cleanup: (Y/N) N pH:

Dilution Factor: 1.00

Number TICs found: 2

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1. 0	Aldol Condensation	5.31	16000	ABJ U
2.	UNKNOWN	29.13	77	J

3/30/95 SC

**APPENDIX E**  
**PESTICIDE/PCB DATA SUMMARY TABLES**

Project: WESTINGHOUSE - HANFORD																						
Laboratory: QUANTERRA																						
Case:		SDG: W0429																				
Sample Number		B0DMT2			B0DMT3																	
Location		Test Pit #2			Test Pit #2																	
Remarks																						
Sample Date		01/17/95			01/17/95																	
Extraction Date		01/20/95			01/20/95																	
Analysis Date		01/25/95			01/25/95																	
Pesticide/PCB		CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
alpha - BHC		1.7	1.8	U	3.1	U																
beta - BHC		1.7	3.5	U	6.2	U																
delta - BHC		1.7	5.3	U	9.3	U																
gamma - BHC (Undane)		1.7	4.5		4.1	U																
Heptachlor		1.7	1.8	UJ	3.1	UJ																
Aldrin		1.7	8.2	J	36	J																
Heptachlor epoxide		1.7	49	UJ	86	UJ																
Endosulfan I		1.7	8.3	U	14	U																
Dieldrin		3.3	1.2	UJ	2.1	UJ																
4,4' - DDE		3.3	25	UJ	82	UJ																
Endrin		3.3	140	UJ	440	UJ																
Endosulfan II		3.3	45	UJ	55	UJ																
4,4' - DDD		3.3	6.5	U	24	U																
Endosulfan sulfate		3.3	39	UJ	68	UJ																
4,4' - DDT		3.3	170	UJ	190	UJ																
Methoxychlor		17.0	100	UJ	180	UJ																
Endrin Aldehyde		3.3	54	UJ	110	UJ																
Tech. Chlordane		1.7	8.3	U	14	U																
Toxaphene		170.0	140	U	250	U																
Arochlor - 1221		33.0	59	U	100	U																
Arochlor - 1232		67.0	59	U	100	U																
Arochlor - 1242/1018		33.0	39	U	68	U																
Arochlor - 1248		33.0	59	U	100	U																
Arochlor - 1254		33.0	2300		9800																	
Arochlor - 1260		33.0	1800		7500																	

E-1

RJR 5/15/95

**APPENDIX F**  
**PESTICIDE/PCB VALIDATED LABORATORY REPORT FORMS**

1D 0302170  
S DATA SHEET

BODMT2 Rev. 00

550-56

SDG No.: W0429

Lab Sample ID: 7344-002

Lab File ID:

Date Sampled : 01-17-95

Date Extracted: 01-20-95

Date Analyzed: 01-25-95

Dilution Factor: 1

Q

2222 2222 2424

25  
4/30/91

$$4 \overline{) 30} \overline{) 9}$$
$$4 \overline{) 30} \overline{) 9}$$

1/87 Rev.

Lab Name: QUANTERRA, MO Contract: 550.56 Rev. 00

Lab Code: ITMO Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: W0429

Matrix: (soil/water) SOIL Lab Sample ID: 7344-004

Sample wt/vol: 30.0 (g/ml) g Lab File ID: \_\_\_\_\_

Level: (low/med) LOW Date Sampled : 01-17-95

% Moisture: not dec. 68 dec. \_\_\_\_\_ Date Extracted: 01-20-95

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 01-25-95

GPC Cleanup: (Y/N) N pH: \_\_\_\_\_ Dilution Factor: 1

CAS NO.	Compound	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>ug/Kg</u>	Q
---------	----------	--	---

319-84-6-----	alpha-BHC	3.1	U
319-85-7-----	beta-BHC	6.2	U
319-86-8-----	delta-BHC	9.3	U
58-89-9-----	gamma-BHC (Lindane)	4.1	U
76-44-8-----	Heptachlor	3.1	<del>U</del>
309-00-2-----	Aldrin	36	/
1024-57-3-----	Heptachlor epoxide	86	<del>U</del>
959-98-8-----	Endosulfan I	14	U
60-57-1-----	Dieldrin	2.1	<del>U</del>
72-55-9-----	4,4'-DDE	82	UX
72-20-8-----	Endrin	440	UX
33213-65-9-----	Endosulfan II	55	<del>UX</del>
72-54-8-----	4,4'-DDD	24	UX
1031-07-8-----	Endosulfan sulfate	68	<del>U</del>
50-29-3-----	4,4'-DDT	190	UX
72-43-5-----	Methoxychlor	180	<del>U</del>
53494-70-5-----	Endrin Aldehyde	110	UX
57-74-9-----	Tech. Chlordane	14	U
8001-35-2-----	Toxaphene	250	U
11104-28-2-----	Aroclor-1221	100	U
11141-28-2-----	Aroclor-1232	100	U
53469-21-9/12674-11-2	Aroclor-1242/1016	68	U
12672-29-6-----	Aroclor-1248	100	U
11097-57-4-----	Aroclor-1254		SD
11096-82-5-----	Aroclor-1260		SD

U: Concentration of analyte is less than the value given.  
SD: See dilution  
X: Elevated detection limit due to PCB interference.

FORM I PEST

1/87 Rev.

1D

## PESTICIDE ORGANICS ANALYSIS DATA SHEET

BODMT4

Lab Name: QUANTERRA, MO Contract: 550-56

Lab Code: ITMO Case No.: \_\_\_\_\_ SAS No.: \_\_\_\_\_ SDG No.: W0430

Matrix: (soil/water) SOIL Lab Sample ID: 7444-008

Sample wt/vol: 30.0 (g/ml) g Lab File ID: \_\_\_\_\_

Level: (low/med) LOW Date Sampled: 01-27-95

% Moisture: not dec. 6 dec. \_\_\_\_\_ Date Extracted: 02-03-95

Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 02-08-95

GPC Cleanup: (Y/N) N pH: \_\_\_\_\_ Dilution Factor: 1

CAS NO.

Compound

CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG

Q

319-84-6-----alpha-BHC	1.1	U	UJ
319-85-7-----beta-BHC	2.1	U	UJ
319-86-8-----delta-BHC	3.2	U	UJ
58-89-9-----gamma-BHC (Lindane)	1.4	U	UJ
76-44-8-----Heptachlor	1.1	U	UJ
309-00-2-----Aldrin	1.4	U	UJ
1024-57-3-----Heptachlor epoxide	30	U	UJ
959-98-8-----Endosulfan I	5.0	U	UJ
60-57-1-----Dieldrin	0.71	U	UJ
72-55-9-----4,4'-DDE	1.4	U	UJ
72-20-8-----Endrin	2.1	U	UJ
33213-65-9-----Endosulfan II	1.4	U	UJ
72-54-8-----4,4'-DDD	3.9	U	UJ
1031-07-8-----Endosulfan sulfate	24	U	UJ
50-29-3-----4,4'-DDT	4.3	U	UJ
72-43-5-----Methoxychlor	63	U	UJ
7421-93-4-----Endrin Aldehyde	8.2	U	UJ
57-74-9-----Chlordane (technical)	5.0	U	UJ
8001-35-2-----Toxaphene	85	U	UJ
11104-28-2-----Aroclor-1221	36	U	UJ
11141-16-5-----Aroclor-1232	36	U	UJ
53469-21-9/12674-11-2-Arochlor-1242/1016	24	U	UJ
12672-29-6-----Aroclor-1248	36	U	UJ
11097-69-1-----Aroclor-1254	36	U	UJ
11096-82-5-----Aroclor-1260	36	U	UJ

U: Concentration of analyte is less than the value given.

FORM I PEST

**APPENDIX G**  
**METALS DATA SUMMARY TABLES**

[illegible]

BHI-00405  
Rev. 00

FIL = Filtered, NA = Not Analyzed, N/A = Not Applicable

## G-E

**APPENDIX H**  
**METALS VALIDATED LABORATORY REPORT FORMS**

BODMT2

[illegible]

ments:

FORM I - IN

SP5 SW-846

## BODMT4

Contract: 550.56

SDG No.: W0430

Lab Sample ID: 7444-008

Date Received: 01/30/95

[illegible]

Texture: \_\_\_\_\_  
Artifacts: \_\_\_\_\_

715 4/24/95

**APPENDIX I**  
**GENERAL CHEMISTRY DATA SUMMARY TABLES**

[illegible]

RHC from RJS  
5/3/93

## **APPENDIX J**

### **GENERAL CHEMISTRY VALIDATED LABORATORY REPORT FORMS**

Quanterra-Richland  
P.O. Box 1970  
Richland, WA 99352

Environmental  
Services

BHI-00405  
Rev. 00

Category: Nitrate  
Method: EPA 300.0  
Matrix: SOLID

Project: 550.56

Sample Date : 01/17/95  
Receipt Date : 01/18/95  
Report Date : 03/01/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil
BODMT6	7344-001	Nitrate	14797-55-8	QCBLK57444-2	01/20/95	01/20/95	0.20	UG/G	U	0.20	1
BODMT6	7344-001DUP	Nitrate	14797-55-8	QCBLK57444-2	01/20/95	01/20/95	0.20	UG/G	U	0.20	1
BODMT6	7344-001MS	Nitrate	14797-55-8	QCBLK57444-2	01/20/95	01/20/95	106	XREC			1
BODMT2	7344-002	Nitrate	14797-55-8	QCBLK57444-2	01/20/95	01/20/95	69.5	UG/G		1.70	5
BODMT3	7344-004	Nitrate	14797-55-8	QCBLK57444-2	01/20/95	01/20/95	50.3	UG/G		1.22	2
NA	QCBLK57444-2	Nitrate	14797-55-8	QCBLK57444-2	01/20/95	01/20/95	0.20	UG/G	U	0.20	1
NA	QCCLCS57444-2	Nitrate	14797-55-8	QCBLK57444-2	01/20/95	01/20/95	100	XREC			1

RLB<sup>c</sup>  
for RJS  
4/7/95

Quanterra-Richland  
P.O. Box 1970  
Richland, WA 99352

Environmental  
Service BHI-00405  
Rev. 00

Category: Orthophosphate  
Method: EPA 300.0  
Matrix: SOLID

Project: 550.56

Sample Date : 01/17/95  
Receipt Date : 01/18/95  
Report Date : 03/01/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil
BDDMT6	7344-001	Ortho-Phosphate	7778-77-0	QCBLK57444-2	01/20/95	01/20/95	9.86	UG/G	U	9.86	1
BDDMT6	7344-001DUP	Ortho-Phosphate	7778-77-0	QCBLK57444-2	01/20/95	01/20/95	9.84	UG/G	U	9.84	1
BDDMT6	7344-001MS	Ortho-Phosphate	7778-77-0	QCBLK57444-2	01/20/95	01/20/95	102	%REC			1
BDDMT2	7344-002	Ortho-Phosphate	7778-77-0	QCBLK57444-2	01/20/95	01/20/95	17.0	UG/G	U	17.0	1
BDDMT3	7344-004	Ortho-Phosphate	7778-77-0	QCBLK57444-2	01/20/95	01/20/95	30.6	UG/G	U	30.6	1
NA	QCBLK57444-2	Ortho-Phosphate	7778-77-0	QCBLK57444-2	01/20/95	01/20/95	10.0	UG/G	U	10.0	1
NA	QCCLCS57444-2	Ortho-Phosphate	7778-77-0	QCBLK57444-2	01/20/95	01/20/95	96	%REC			1

RBC  
RJS  
4/1/95

Quanterra-Richland  
P.O. Box 1970  
Richland, WA 99352

Environmental  
Services BHI-00405  
Rev. 00

Category: Fluoride  
Method: EPA 300.0  
Matrix: SOLID

Project: 550.56

Sample Date : 01/17/95  
Receipt Date : 01/18/95  
Report Date : 03/01/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil
BODMT6	7344-001	Fluoride	16984-48-8	QCBLS7444-2	01/20/95	01/20/95	0.99	UG/G	U	0.99	1
BODMT6	7344-001DUP	Fluoride	16984-48-8	QCBLS7444-2	01/20/95	01/20/95	0.98	UG/G	U	0.98	1
BODMT6	7344-001MS	Fluoride	16984-48-8	QCBLS7444-2	01/20/95	01/20/95	107	%REC			1
BODMT2	7344-002	Fluoride	16984-48-8	QCBLS7444-2	01/20/95	01/20/95	1.70	UG/G	U	1.70	1
BODMT3	7344-004	Fluoride	16984-48-8	QCBLS7444-2	01/20/95	01/20/95	6.25	UG/G		3.06	1
NA	QCBLS7444-2	Fluoride	16984-48-8	QCBLS7444-2	01/20/95	01/20/95	1.00	UG/G	U	1.00	1
NA	QCLCS7444-2	Fluoride	16984-48-8	QCBLS7444-2	01/20/95	01/20/95	103	%REC			1

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Project: 550.56

Category: TOX  
Method: EPA 9020  
Matrix: SOLIDSample Date : 01/17/95  
Receipt Date : 01/18/95  
Report Date : 03/01/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Di
BODMT6	7344-001	EOX	IT-EOX	QCBLK58657-1	02/06/95	02/06/95	47.1	UG/G	U	47.1	
BODMT6	7344-001DUP	EOX	IT-EOX	QCBLK58657-1	02/06/95	02/06/95	46.1	UG/G	U	46.1	
BODMT6	7344-001MS	EOX	IT-EOX	QCBLK58657-1	02/06/95	02/06/95	101	%REC			
BODMT2	7344-002	EOX	IT-EOX	QCBLK58657-1	02/06/95	02/06/95	86.8	UG/G	U	86.8	
BODMT3	7344-004	EOX	IT-EOX	QCBLK58657-1	02/06/95	02/06/95	150	UG/G	U	150	
NA	QCBLK58657-1	EOX	IT-EOX	QCBLK58657-1	02/06/95	02/06/95	50.0	UG/G	U	50.0	
NA	QCCLS58657-1	EOX	IT-EOX	QCBLK58657-1	02/06/95	02/06/95	99	%REC			

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Category: NO2-NO3  
Method: EPA 353.1  
Matrix: SOLID

Project: 550.56

Sample Date : 01/17/95  
Receipt Date : 01/18/95  
Report Date : 03/01/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BODMT6	7344-001	Nitrate/Nitrite	C-005	QCBLK57497-2	01/24/95	01/24/95	0.48	UG/G	U	0.48	1
BODMT6	7344-001DUP	Nitrate/Nitrite	C-005	QCBLK57497-2	01/24/95	01/24/95	0.50	UG/G	U	0.50	1
BODMT6	7344-001MS	Nitrate/Nitrite	C-005	QCBLK57497-2	01/24/95	01/24/95	104	%REC			1
BODMT2	7344-002	Nitrate/Nitrite	C-005	QCBLK57497-2	01/24/95	01/24/95	53.4	UG/G		4.40	5
BODMT3	7344-004	Nitrate/Nitrite	C-005	QCBLK57497-2	01/24/95	01/24/95	35.4	UG/G		3.09	2
NA	QCBLK57497-2	Nitrate/Nitrite	C-005	QCBLK57497-2	01/24/95	01/24/95	0.50	UG/G	U	0.50	1
NA	QCCLS57497-2	Nitrate/Nitrite	C-005	QCBLK57497-2	01/24/95	01/24/95	92	%REC			1

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Project: 550.56

Category: Nitrite  
Method: EPA 300.0  
Matrix: SOLID

Sample Date : 01/27/95  
Receipt Date : 01/30/95  
Report Date : 03/07/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BODMS4	7444-001	Nitrite	7632-00-0	QCBLK58660-1	02/03/95	02/03/95	0.21	UG/G	U	0.21	1
BODMS4	7444-001DUP	Nitrite	7632-00-0	QCBLK58660-1	02/03/95	02/03/95	0.21	UG/G	U	0.21	1
BODMS4	7444-001MS	Nitrite	7632-00-0	QCBLK58660-1	02/03/95	02/03/95	103	%REC			5
BODMT4	7444-008	Nitrite	7632-00-0	QCBLK58660-1	02/03/95	02/03/95	0.19	UG/G	U	0.19	1
NA	QCBLK58660-1	Nitrite	7632-00-0	QCBLK58660-1	02/03/95	02/03/95	0.20	UG/G	U	0.20	1
NA	QCLCS58660-1	Nitrite	7632-00-0	QCBLK58660-1	02/03/95	02/03/95	98	%REC			1

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Category: Chloride  
Method: EPA 300.0  
Matrix: SOLID

Project: 550.56

Sample Date : 01/27/95  
Receipt Date : 01/30/95  
Report Date : 03/07/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BODMS4	7444-001	Chloride	16887-00-6	QCBLK58660-1	02/03/95	02/03/95	2.59	UG/G	U	2.59	1
BODMS4	7444-001DUP	Chloride	16887-00-6	QCBLK58660-1	02/03/95	02/03/95	2.58	UG/G	U	2.58	1
BODMS4	7444-001MS	Chloride	16887-00-6	QCBLK58660-1	02/03/95	02/03/95	100	%REC			5
BODMT4	7444-008	Chloride	16887-00-6	QCBLK58660-1	02/03/95	02/03/95	2.40	UG/G	U	2.40	1
NA	QCBLK58660-1	Chloride	16887-00-6	QCBLK58660-1	02/03/95	02/03/95	2.50	UG/G	U	2.50	1
NA	QCCLS58660-1	Chloride	16887-00-6	QCBLK58660-1	02/03/95	02/03/95	90	%REC			1

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Project: 550.56

Category: Sulfate  
Method: EPA 300.0  
Matrix: SOLID

Sample Date : 01/27/95  
Receipt Date : 01/30/95  
Report Date : 03/07/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BODMS4	7444-001	Sulfate	14808-79-8	QCBLK58660-1	02/03/95	02/03/95	25.1	UG/G		10.4	1
BODMS4	7444-001DUP	Sulfate	14808-79-8	QCBLK58660-1	02/03/95	02/03/95	24.7	UG/G		10.3	1
BODMS4	7444-001MS	Sulfate	14808-79-8	QCBLK58660-1	02/03/95	02/03/95	95	%REC			5
BODMT4	7444-008	Sulfate	14808-79-8	QCBLK58660-1	02/03/95	02/03/95	54.1	UG/G		9.60	1
NA	QCBLK58660-1	Sulfate	14808-79-8	QCBLK58660-1	02/03/95	02/03/95	10.0	UG/G	U	10.0	1
NA	QCCLCS58660-1	Sulfate	14808-79-8	QCBLK58660-1	02/03/95	02/03/95	92	%REC			1

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Project: 550.56

Category: NO2-NO3  
Method: EPA 353.1  
Matrix: SOLID

Sample Date : 01/27/95  
Receipt Date : 01/30/95  
Report Date : 03/07/95

Client ID	Quanterra ID	Analyte	CAS Number	Blank Sample Name	Prep. Date	Analyses Date	Result	Unit	Qual.	Detection Limit	Dil.
BODMS4	7444-001	Nitrate/Nitrite	C-005	QCBLK59558-1	02/15/95	02/15/95	4.73	UG/G		0.51	1
BODMS4	7444-001DUP	Nitrate/Nitrite	C-005	QCBLK59558-1	02/15/95	02/15/95	4.75	UG/G		0.51	1
BODMS4	7444-001MS	Nitrate/Nitrite	C-005	QCBLK59558-1	02/15/95	02/15/95	80	%REC			1
BODMT4	7444-008	Nitrate/Nitrite	C-005	QCBLK59558-1	02/15/95	02/15/95	1.00	UG/G		0.53	1
NA	QCBLK59558-1	Nitrate/Nitrite	C-005	QCBLK59558-1	02/15/95	02/15/95	0.50	UG/G	U	0.50	1
NA	QCCLCS59558-1	Nitrate/Nitrite	C-005	QCBLK59558-1	02/15/95	02/15/95	107	%REC			1

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**APPENDIX K**  
**RADIOCHEMISTRY DATA SUMMARY TABLES**

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**APPENDIX L**  
**RADIOCHEMISTRY VALIDATED LABORATORY REPORT FORMS**

## SAMPLE RESULTS

LAB NAME:	ITAS-RICHLAND	SDG:	W0429
LAB SAMPLE ID:	50132303	MATRIX:	SOIL
CLIENT ID:	B0DMT2	DATE RECEIVED:	1/18/95

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
CO-58	1.65E-02 U	2.6E-02	2.6E-02	4.42E-02	pCi/g	N/A	RD3219
CO-60	9.29E-01	6.0E-02	1.1E-01	N/A	pCi/g	N/A	RD3219
CS-137DA	2.72E+00	7.0E-02	2.8E-01	N/A	pCi/g	N/A	RD3219
EU-152	1.55E+00	1.2E-01	1.9E-01	N/A	pCi/g	N/A	RD3219
EU-154	3.31E-01	6.6E-02	7.4E-02	1.36E-01	pCi/g	N/A	RD3219
EU-155	7.90E-02 U	5.9E-02	6.0E-02	8.92E-02	pCi/g	N/A	RD3219
FE-59	4.54E-02 U	6.8E-02	6.8E-02	1.07E-01	pCi/g	N/A	RD3219
K-40	9.57E+00	5.7E-01	1.1E+00	N/A	pCi/g	N/A	RD3219
RA-224DA	8.63E-01	4.5E-02	9.7E-02	N/A	pCi/g	N/A	RD3219
RA-226DA	8.13E-01	7.0E-02	1.1E-01	N/A	pCi/g	N/A	RD3219
RA-228DA	7.21E-01 J	1.3E-01	1.5E-01	N/A	pCi/g	N/A	RD3219
U-238DLP	2.76E+00 J	1.2E+00	1.2E+00	N/A	pCi/g	N/A	RD3219
ALPHA	9.95E+00	4.8E+00	4.9E+00	5.93E+00	pCi/g	100.00%	RD3222
BETA	2.06E+01	3.3E+00	3.6E+00	3.58E+00	pCi/g	100.00%	RD3222

Number of Results: 14

*RBC*  
*4-18-95*

**SAMPLE RESULTS**

LAB NAME: ITAS-RICHLAND      SDG: W0430  
LAB SAMPLE ID: 50151812      MATRIX: SOIL  
CLIENT ID: B0DMT4      DATE RECEIVED: 1/30/95

ISOTOPE	RESULT	COUNTING ERROR (2s)	TOTAL ERROR (2s)	MDA	REPORT UNIT	YIELD	METHOD NUMBER
CO-58	4.35E-03 U	1.2E-02	1.2E-02	2.06E-02	pCi/g	N/A	RD3219
CO-60	1.19E-02 U	1.0E-02	1.0E-02	1.90E-02	pCi/g	N/A	RD3219
CS-137DA	2.54E-02	1.4E-02	1.4E-02	N/A	pCi/g	N/A	RD3219
EU-152	1.86E-02 U	2.6E-02	2.6E-02	4.23E-02	pCi/g	N/A	RD3219
EU-154	-5.84E-03 U	3.1E-02	3.1E-02	5.33E-02	pCi/g	N/A	RD3219
EU-155	3.01E-02 U	2.2E-02	2.3E-02	3.84E-02	pCi/g	N/A	RD3219
FE-59	-4.77E-02 U	3.3E-02	3.4E-02	5.04E-02	pCi/g	N/A	RD3219
K-40	9.42E+00	4.3E-01	1.0E+00	N/A	pCi/g	N/A	RD3219
RA-224DA	4.14E-01	2.8E-02	5.0E-02	N/A	pCi/g	N/A	RD3219
RA-226DA	3.67E-01	4.0E-02	5.5E-02	N/A	pCi/g	N/A	RD3219
RA-228DA	4.42E-01	6.7E-02	8.0E-02	N/A	pCi/g	N/A	RD3219
ALPHA	1.90E+00 U	2.7E+00	2.7E+00	5.34E+00	pCi/g	100.00%	RD3222
BETA	1.59E+01	3.0E+00	3.2E+00	3.66E+00	pCi/g	100.00%	RD3222

Number of Results: 13

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